

#AI, #VR, and #IoT Are Coming to a Courthouse Near You!

By Judge Herbert B. Dixon Jr.

The title of this column got your attention, didn't it? I thought that would likely happen if I used Twitter hashtag abbreviations to arouse your curiosity. The abbreviations stand for Artificial Intelligence (AI), Virtual Reality (VR), and the Internet of Things (IoT). Now that the hashtags have been decoded to plain English, I assume that you have a passing familiarity with the first two concepts, but less familiarity with the latter.

Artificial Intelligence (AI)

For this column, AI refers to the ability of computers to perform information-gathering and decision-making processes typically attributed to humans and their intelligence. One example of AI referenced by many writers is the Hal 9000 Computer in the movie *2001: A Space Odyssey*. Another example often mentioned by others, which I also referred to in a previous column, is the IBM Watson computer that won a contest against two former *Jeopardy* champions.¹ Finally, a current example of AI is Ava, the super-intelligence in Alex Garland's 2015 movie *Ex Machina*.

Virtual Reality (VR)

You already have some understanding of VR if you recognize a device named Samsung Gear VR, Oculus Rift, HTC Vive, or Google Cardboard. If you do not recognize the name of any of these devices, I offer you my preferred explanation of VR, which I adapted from the online edition of the *Oxford Dictionary*. VR is a computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using specialized electronic equipment, such as a helmet with a screen inside or sensor-activated gloves, hand controls, or other equipment.²



Internet of Things (IoT)

The IoT is a shorthand reference to devices (things) that use technology to communicate wirelessly between themselves, either storing data, executing preprogrammed instructions, or providing information to human users. One example of IoT is the technology that causes your refrigerator to notify you or the grocery store that you're almost out of milk. Another example is the technology that can cause a household thermostat to learn your living pattern and automatically adjust the house temperature, or permits you to communicate with your networked home from a remote location (e.g., while you are at your office or away on vacation) to lock doors, confirm the operation of household utilities, or adjust temperature and hot water settings. This technology also includes your smartwatch and its communications with your mobile device concerning your physical activity and vital statistics, and a camera and motion sensor that detect

someone approaching the front door of your home and provide an image for you to view and audio capability for you to query the approaching individual as if you were on the other side of the door. IoT also includes real-time information that your high-tech automobile sends to a server



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somewhere in the cloud about your vehicle's speed, directions, GPS location, and operating condition. IoT technology can also provide you the ability to measure the temperature in your vehicle parked outside in the brutal cold, start the vehicle, and turn on the vehicle's heat while you are inside your comfortable house, or monitor your self-tending garden and adjust water, temperature, and light conditions based on real-time information that the plant sensors are transmitting to you.

Think outside the box about the legal issues that some technological advancements may present in your courtroom in the near or not-too-distant future.

One prominent information technology (IT) research organization projects that by the end of 2016, the IoT will have over 6.3 billion "connected things," and by the year 2020, that number will increase to nearly 20.8 billion.³ Yes, that is a lot of "things"! IoT includes many other commercial and consumer technological capabilities, but I think you get the point.

IoT Evidence Affecting the Outcome of a Case

Already, IoT has affected the outcome of pending cases. Consider one case where the testimony of a complaining witness that she was asleep at home became unraveled when her Fitbit activity data contradicted her statement. The Fitbit data revealed that the complaining witness was awake and walking around at the time of the alleged assault. The contradiction between the testimony and the Fitbit activity data ultimately was the basis for a charge against the complaining witness that she had staged a crime scene and made a false police report.⁴

Another example of IoT in the courthouse might be a civil lawsuit for personal injury in which, in addition to medical testimony, the plaintiff also proffers evidence from her smartwatch activity log that her physical activity levels are now under a baseline for someone of her age and profession and substantially less than before she suffered her injury. This use of physical activity data also predicts the eventual use of similar data from a claimant's smartphone or activity tracker by insurance

companies or in criminal prosecutions to prove that the claimant's activity and capabilities are greater than alleged or that the claim is fraudulent.⁵

Using IoT to Locate an Attorney in the Courthouse

In urban courthouse settings, such as mine, attorneys typically have multiple appearances scheduled in numerous courtrooms on any day. Until IoT, chief judges and individual judges have employed various methods to gain information regarding the exact location in the courthouse of a missing attorney. In the courthouse in which I sit, we initially instituted a "call-in" list wherein an attorney must call a central office at the beginning of the day to advise of every courtroom in which she has a scheduled appearance. The clerk's office circulates the list to all courtrooms and, when a particular judge is looking for that attorney, the judge's staff would call the courtrooms on the list asking if the attorney is present and request that the attorney be sent to the calling courtroom immediately or as soon as possible. This method

is not foolproof. On many occasions when an attorney reported to my courtroom late or after many unsuccessful efforts to locate the attorney, the response would be, "I was on the list!"

Now, imagine an RFID (radio frequency identification) chip being embedded in the attorney's Bar card or an app installed on her telephone recorded by sensors at every entry to the courthouse and each courtroom. The courtroom staff could query the "Courthouse Attorney Location System" and learn the attorney's time of entry and exit of the courthouse and every courtroom. Wow! An attorney who had multiple 9:30 a.m. scheduled appearances and did not arrive at the courthouse until 11:30 a.m. would need to provide some significant explanations.

Immersive Virtual Reality

Imagine during one of your future trials that jurors in your courtroom are provided with virtual reality headsets, which allow them to view the accident site or crime scene digitally and walk around or be guided through a 3D world to examine vital details of the scene.

How can such an evidentiary presentation be accomplished? A system is being developed whereby investigators use a robot system inspired by NASA's Curiosity Mars rover using 3D imaging and panoramic videography equipment to record virtual reality video of the scene.⁶ The captured 360° immersive video and photographs of the scene would allow recreation of a VR experience with video and pictures of the original scene from every angle. Admissibility of this evidence would require a showing that the VR simulation fairly and accurately depicts what it represents. If a judge permits presentation of the evidence after its accuracy is established, jurors receiving the evidence could turn their heads and view various aspects of the scene by looking up, down, and around, and zooming in and out.

Unlike an animation or edited video initially created to demonstrate one party's point of view, the purpose of this type of evidence would be to gather data and objectively preserve the scene without staging or tampering. Even further, this

approach would allow investigators to revisit scenes as they existed during the initial forensic examination and give jurors a vivid rendition of the site as it existed when the events occurred.

Also, if the site examiners used capabilities provided by Google's Project Tango during their examination of the scene, that would eliminate the need for sketches of the scene by capturing and highlighting the precise distance between objects and the relative position of all visible evidence as it existed upon arrival of the investigators.⁷

Autonomous Cars and Smart Traffic Light Controls

A future trial of interest in the courthouse may concern a motor vehicle intersection accident involving an autonomous vehicle (also called a driverless vehicle) at an intersection using smart traffic light controls (also called Autonomous Intersection Management (AIM) controls). In this future case, the intersection where these events occurred had traffic lights designed to communicate with oncoming autonomous vehicles, which themselves were programmed to recognize the visible and digital signals of the traffic light. When the smart traffic light determined there was no approaching vehicle traveling along one cross street and that an autonomous vehicle was at the other cross street waiting at the intersection, the smart traffic light sent a digital signal to the waiting autonomous vehicle that its red light was changing to green to allow that vehicle to travel through the intersection. After the light had changed and the autonomous vehicle started across the intersection, a speeding truck entered the intersection from the autonomous vehicle's right seemingly out of nowhere. The autonomous vehicle's computer recognized the pending collision and swerved to avoid the truck. The swerving vehicle elected to avoid a crowd of people standing at a bus stop by plowing into a concrete wall, resulting in substantial injuries to the driver.

The injured autonomous vehicle's driver (who was really a passenger because a fully autonomous vehicle is actually driverless) sued the truck driver. He also sued the autonomous vehicle's manufacturer and

software programmer on the grounds of negligence based on the AI computer program guiding the autonomous vehicle to plow into a concrete wall rather than a path that likely would not have caused substantial harm to the autonomous vehicle's driver. Finally, the autonomous vehicle's driver sued the municipality and software developer that installed the smart intersection traffic light, which failed to note the truck speeding through the intersection. Yes, it is complicated; however, whether you like the idea or not, as self-driving cars become common, life-and-death decisions once made by humans will increasingly shift to the AI machines.⁸ According to one senior systems engineer at a security testing firm, car companies finally realize that what they are selling is just a big computer you sit in.⁹

AI and IoT Pretrial Discovery Issues

As part of the discovery process during the lawsuit filed by the autonomous vehicle driver, the injured driver sought discovery of digital data stored within the vehicle and all data regarding this event transmitted for permanent or temporary storage to any backup server or the cloud. The injured driver also sought digital data regarding the truck's speed and direction leading up to the truck's near miss involving the autonomous vehicle. The injured driver also sought a court order for examination of digital data generated during the last several minutes by the GPS unit installed in the truck and the data that the device was streaming in real time to the cloud, and any data that may have been automatically downloaded to the truck owner's home computer. Obviously, the pretrial investigation and preparation expenses for this automobile accident will exceed those expenses for a typical intersection collision that does not involve AI and IoT.

Epilogue

Take a moment and catch your breath, everyone. Although some technologies described above exist now, not all the capabilities are likely to show up in your courtroom soon. Sometimes the technology described is merely a concept or has only advanced to a development or testing

phase. However, do not relax too much. If anything is predictable, it is that technological advances have caused and will continue to cause a disruptive effect on our daily lives—even before we have any appreciation that the new technical capabilities are on the horizon. I hope my brief description of these technologies will cause you to think outside the box about the legal issues that some technological advancements may present in your courtroom in the near or not-too-distant future. ■

Endnotes

1. Herbert Dixon, *Technology and the Future of Legal Services*, 54 JUDGES' J., no. 3, Summer 2015.

2. Compare with the definition of virtual reality by *Oxford Dictionaries* found at http://www.oxforddictionaries.com/us/definition/american_english/virtual-reality.

3. Press Release, Gartner, Inc., Gartner Says 6.4 Billion Connected "Things" Will Be in Use in 2016, Up 30 Percent from 2015 (Nov. 10, 2015), <http://www.gartner.com/newsroom/id/3165317>.

4. Brett Hambright, *Woman Staged "Rape" Scene with Knife, Vodka, Called 9-1-1, Police Say*, LANCASTERONLINE (June 19, 2015), http://lancasteronline.com/news/local/woman-staged-rape-scene-with-knife-vodka-called-article_9295bdbe-167c-11e5-b6eb-07d1288cc937.html.

5. See, e.g., Parmy Olson, *Fitbit Data Now Being Used in the Courtroom*, FORBES (Nov. 16, 2014), <http://www.forbes.com/sites/parmyolson/2014/11/16/fitbit-data-court-room-personal-injury-claim/#13e950fa209f>.

6. Mehzeb Chowdhury, *Virtual Reality Robots Could Help Teleport Juries to Crime Scenes*, THE CONVERSATION (Aug. 26, 2016), <http://theconversation.com/virtual-reality-robots-could-help-teleport-juries-to-crime-scenes-64382>.

7. *Id.*

8. Andrew O'Keefe, *Ray Kurzweil Explores How Self-Driving Cars Will Choose Between Life or Death*, SINGULARITYHUB (Aug. 25, 2016), <http://singularityhub.com/2016/08/25/ray-kurzweil-explores-how-self-driving-cars-will-choose-between-life-or-death>.

9. Alex Hern, *Car Hacking Is the Future—and Sooner or Later You'll Be Hit*, THE GUARDIAN (Aug. 28, 2016), <https://www.theguardian.com/technology/2016/aug/28/car-hacking-future-self-driving-security>.